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PLEASANT HILL RESERVOIR, ASHLAND AND RICHLAND COUNTIES

PACIFIC NORTHWEST ENVIRONMENTAL RESEARCH
LABORATORY

PREPARED FOR
NATIONAL ENVIRONMENTAL RESEARCH CENTER

JUNE 1975

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U.S. ENVIRONMENTAL PROTECTION AGENCY
NATIONAL EUTROPHICATION SURVEY

WORKING PAPER SERIES

REPORT

ON

PLEASANT HILL RESERVOIR

ASHLAND AND RICHLAND COUNTIES

OHIO

EPA REGION V

WORKING PAPER No. 408

PACIFIC NORTHWEST ENVIRONMENTAL RESEARCH LABORATORY

An Associate Laboratory of the

NATIONAL ENVIRONMENTAL RESEARCH CENTER - CORVALLIS, OREGON

and

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REPORT
ON
PLEASANT HILL RESERVOIR
ASHLAND AND RICHLAND COUNTIES
OHIO

EPA REGION V

WORKING PAPER No. 408

WITH THE COOPERATION OF THE

OHIO ENVIRONMENTAL PROTECTION AGENCY

AND THE

OHIO NATIONAL GUARD

JUNE, 1975

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16. ABSTRACT

Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

1a

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FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to fresh water lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point-source discharge reduction and non-point source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's fresh water lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by EPA and to augment plans implementation by the states.

ACKNOWLEDGMENT

The staff of the National Eutrophication Survey (Office of Research & Development, U. S. Environmental Protection Agency) expresses sincere appreciation to the Ohio Environmental Protection Agency for professional involvement, to the Ohio National Guard for conducting the tributary sampling phase of the Survey, and to those Ohio wastewater treatment plant operators who provided effluent samples and flow data.

Ned Williams, Director, and Tom Birch, Ken Carr, Larry Dietrick, Ron Havlice, Larry Korecko, Rod Mehlhop, Terry Wheeler, and John Youger, Ohio Environmental Protection Agency, provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports, and provided critiques most useful in the preparation of this Working Paper series.

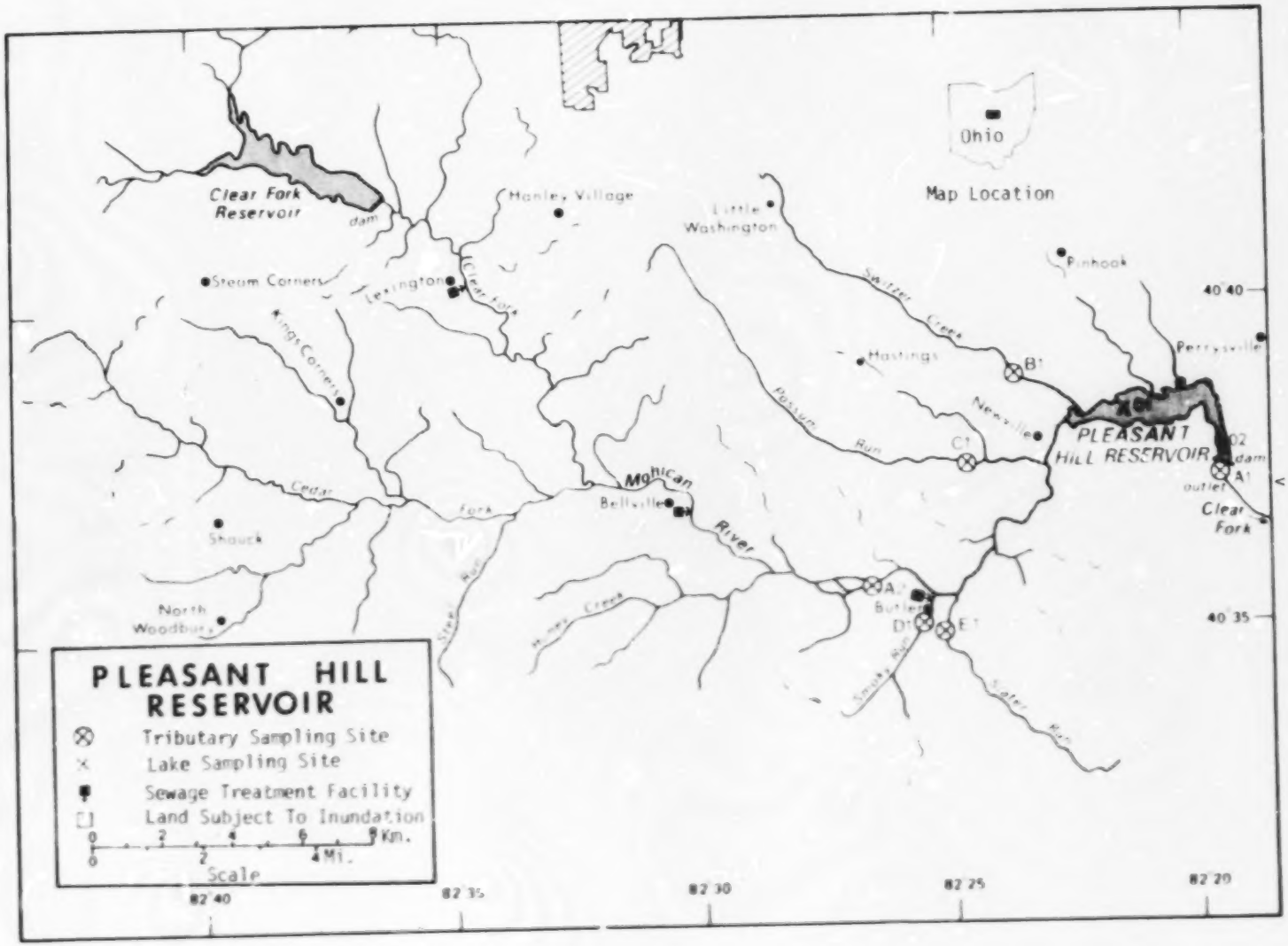
Major General Dana L. Stewart, then the Adjutant General of Ohio, and Project Officer Lt. Colonel Robert C. Timmons, who directed the volunteer efforts of the Ohio National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF OHIO

LAKE NAME	COUNTY
Atwood	Carroll, Tuscarawas
Beach City	Stark, Tuscarawas
Berlin	Mahoning, Portage, Stark
Buckeye	Fairfield, Licking, Perry
Charles Mill	Ashland, Richland
Deer Creek	Fayette, Pickaway
Delaware	Delaware
Dillon	Muskingum
Grand Lake of St. Marys	Auglaize, Mercer
Grant	Brown
Holiday	Huron
Hoover	Delaware, Franklin
Indian	Logan
Loramie	Auglaize, Shelby
Mosquito Creek	Trumbull
O'Shaughnessy	Delaware
Pymatuning	Ashtabula, OH; Crawford, PA
Pleasant Hill	Ashland, Richland
Rocky Fork	Highland
Shawnee	Greene
Tappan	Harrison


Ohio
Map Location
Clear Fork Reservoir
dam
Hanley Village
Little Washington
Pinhook
Steum Corners
Lexington
Clear Fork
Switzer Creek
40°40'
Perrysville
Kings Corners
Hastings
B'
Possum Run
Newville
PLEASANT HILL RESERVOIR
dam
outlet
A'
C'
Clear Fork
Mohican River
Cedar Fork
Bellville
Shauck
North Woodbury
Cedar Run
Honey Creek
A'
Butler
D'
E'
Switzer Run
40°35'
PLEASANT HILL RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Land Subject To Inundation
0 2 4 6 8 Km.
0 2 4 Mi.
Scale
82°40'
82°35'
82°30'
82°25'
82°20'

PLEASANT HILL RESERVOIR

STORET NO. 3924

I. CONCLUSIONS

A. Trophic Condition:

Survey data indicate that Pleasant Hill Reservoir is eutrophic. It ranked third in overall trophic quality when the 20 Ohio lakes sampled in 1973 were compared using a combination of six parameters*. One of the lakes had less median total phosphorus, six had less and one had the same median dissolved phosphorus, six had less median inorganic nitrogen, seven had less mean chlorophyll a, but none of the lakes had greater mean Secchi disc transparency. Marked depression of dissolved oxygen with depth occurred at station 2 in July and October.

Survey limnologists noted much rooted aquatic vegetation along the shoreline between stations 1 and 2 (see map, page v).

B. Rate-Limiting Nutrient:

The algal assay results indicate that the primary productivity of Pleasant Hill Reservoir was limited by phosphorus at the time the sample was taken (04/20/73). The lake data indicate phosphorus limitation at all sampling stations and times.

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* See Appendix A.

C. Nutrient Controllability:

1. Point sources--The phosphorus contribution of known point sources accounted for 71.1% of the total load reaching Pleasant Hill Reservoir during the sampling year. The wastewater treatment plant at Lexington contributed 39.2%, the plant at Belleville contributed 22.0%, and the plant at Butler contributed 9.9% of the total. In addition, four industrial sources discharge to the reservoir via Switzer Creek and an unnamed tributary of the Mohican River (see page 10). However, phosphorus loads from these sources probably are relatively insignificant as indicated by the low phosphorus export rates of the tributaries (see discussion of non-point sources below).

The present phosphorus loading of 3.51 $g/m^2/yr$ is 2.5 times that proposed by Vollenweider (Vollenweider and Dillon, 1974) as a eutrophic loading (see page 13). A 90% reduction in the phosphorus inputs of the listed point sources would lower the loading to 1.26 $g/m^2/yr$ which is less than a eutrophic loading. The reduction should result in improvement in the trophic condition since the reservoir is phosphorus limited, and the mean hydraulic retention time is a relatively short 3[illegible] days.

2. Non-point sources--The phosphorus contribution of non-point sources accounted for 28.9% of the total phosphorus input to the reservoir. The Mohican River contributed 14.2%, Switzer Creek contributed 3.7%, and the remaining three tributaries contributed 6.4% of the total, collectively. Ungaged tributaries were estimated to have contributed 4.1% of the total.

The phosphorus exports of the sampled tributaries were relatively low as compared to Ohio streams sampled elsewhere (see page 13). For example, the mean of the phosphorus export rates of the Pleasant Hill Reservoir tributaries was 11 $kg/km^2/yr$ (range of 5-16 $kg/km^2/yr$) while Delaware Reservoir* tributaries had a mean export rate of 73 $kg/km^2/yr$ (range of 37-129 $kg/km^2/yr$), and Grand Lake of St. Marys** tributaries had a mean rate of 70 $kg/km^2/yr$ (range of 45-131 $kg/km^2/yr$).

The low export rates indicate that phosphorus loads from the industrial point sources probably are negligible.

* Working Paper No. 399.
** Working Paper No. 411.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS†

A. Lake Morphometry††:

1. Surface area: 3.44 kilometers^2.
2. Mean depth: 4.8 meters.
3. Maximum depth: >11.0 meters.
4. Volume: 16.512 x 10^6 m^3.
5. Mean hydraulic retention time: 35 days (based on outlet flow).

B. Tributary and Outlet:
(See Appendix C for flow data)

1. Tributaries -

Name	Drainage area (km^2)*	Mean flow (m^3/sec)*
Clear Fk., Mohican River	352.2	3.5
Switzer Creek	28.5	0.3
Possum Run	38.1	0.4
Smoky Run	16.8	0.2
Slater Run	21.9	0.2
Minor tributaries & immediate drainage -	49.3	0.5
Total	506.8	5.1

2. Outlet -

Clear Fk., Mohican River	510.2**	5.4

C. Precipitation***:

1. Year of sampling: 107.6 centimeters.
2. Mean annual: 94.9 centimeters.

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† Table of metric conversions--Appendix B.
†† Youger, 1975.
* For limits of accuracy, see Working Paper No. 175, "...Survey Methods, 1973-1976".
** Includes area of lake.
*** See Working Paper No. 175.

III. LAKE WATER QUALITY SUMMARY

Pleasant Hill Reservoir was sampled three times during the open-water season of 1973 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from two stations on the lake and from two or more depths at each station (see map, page v). During each visit, a single depth-integrated (4.6 m or near bottom to surface) sample was composited from the stations for phytoplankton identification and enumeration; and during the first visit, a single 18.9-liter depth-integrated sample was composited for algal assays. Also each time, a depth-integrated sample was collected from each of the stations for chlorophyll a analysis. The maximum depths sampled were 2.4 meters at station 1 and 11.0 meters at station 2.

The lake sampling results are presented in full in Appendix D and are summarized in the following table.

A. SUMMARY OF PHYSICAL AND CHEMICAL CHARACTERISTICS FOR PLEASANT HILL LAKE
STORET CODE 3924

PARAMETER	1ST SAMPLING (4/20/73) 2 SITES RANGE	MEAN	MEDIAN	2ND SAMPLING (7/30/73) 2 SITES RANGE	MEAN	MEDIAN	3RD SAMPLING (10/ 6/73) 2 SITES RANGE	MEAN	MEDIAN
TEMP (C)	9.1 - 13.4	11.2	11.2	22.6 - 25.2	23.9	23.9	19.1 - 20.5	19.8	19.7
DISS OXY (MG/L)	10.9 - 13.9	12.1	12.1	0.3 - 8.3	5.1	5.0	3.6 - 7.4	5.8	6.4
CNDCTVY (MCROMO)	280. - 310.	294.	295.	342. - 346.	344.	344.	327. - 330.	329.	330.
PH (STAND UNITS)	8.3 - 8.8	8.6	8.6	7.5 - 8.6	8.0	7.9	7.6 - 8.1	7.9	8.0
TOT ALK (MG/L)	101. - 110.	104.	102.	129. - 140.	134.	133.	145. - 150.	147.	147.
TOT P (MG/L)	0.018 - 0.030	0.025	0.024	0.045 - 0.070	0.053	0.048	0.035 - 0.061	0.046	0.038
ORTHO P (MG/L)	0.004 - 0.013	0.006	0.005	0.010 - 0.016	0.012	0.010	0.009 - 0.014	0.011	0.010
NO2+NO3 (MG/L)	0.780 - 0.840	0.819	0.820	0.070 - 0.220	0.170	0.190	0.060 - 0.220	0.134	0.110
AMMONIA (MG/L)	0.020 - 0.070	0.031	0.025	0.040 - 0.340	0.158	0.150	0.110 - 0.420	0.200	0.150
KJEL N (MG/L)	0.200 - 0.400	0.312	0.300	0.600 - 1.000	0.820	0.800	0.500 - 1.180	0.700	0.600
INORG N (MG/L)	0.800 - 0.910	0.850	0.845	0.210 - 0.430	0.328	0.350	0.250 - 0.480	0.334	0.300
TOTAL N (MG/L)	1.000 - 1.220	1.131	1.135	0.770 - 1.190	0.990	1.000	0.700 - 1.160	0.834	0.720
CHLRPYL A (UG/L)	32.3 - 41.7	37.0	37.0	10.0 - 24.6	17.3	17.3	12.7 - 15.8	14.2	14.2
SECCHI (METERS)	0.9 - 1.4	1.1	1.1	1.0 - 1.1	1.0	1.0	0.8 - 1.4	1.1	1.1

B. Biological characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
04/20/73	1. Aphanothece sp.	8,274
	2. Stephanodiscus sp.	2,600
	3. Oscillatoria sp.	1,894
	4. Flagellates	1,792
	5. Synedra sp.	1,609
	Other genera	1,689
	Total	17,858
07/30/73	1. Cryptomonas sp.	1,712
	2. Cyclotella sp.	1,317
	3. Flagellates	922
	4. Raphidiopsis sp.	494
	5. Melosira sp.	461
	Other genera	2,239
	Total	7,145
10/06/73	1. Melosira sp.	3,053
	2. Flagellates	1,599
	3. Stephanodiscus sp.	1,163
	4. Spiral cells	1,066
	5. Mesostigma sp.	557
	Other genera	3,294
	Total	10,732

2. Chlorophyll a -

Sampling Date	Station Number	Chlorophyll a (µg/l)
04/20/73	01	32.3
	02	41.7
07/30/73	01	24.6
	02	10.0
10/06/73	01	15.8
	02	12.7

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked -

Spike (mg/l)	Ortho P Conc. (mg/l)	Inorganic N Conc. (mg/l)	Maximum yield (mg/l-dry wt.)
Control	0.012	0.868	0.2
0.050 P	0.062	0.868	16.9
0.050 P + 1.0 N	0.062	1.868	17.8
1.0 N	0.012	1.868	0.3

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential primary productivity of Pleasant Hill Reservoir was moderately low at the time the sample was collected (04/20/73). Also, the significant increase in yield when only phosphorus was added indicates that this body of water was limited by phosphorus at that time. Note that the addition of only nitrogen resulted in a yield not significantly greater than that of the control.

The lake data substantiate phosphorus limitation; i.e., the mean inorganic nitrogen/orthophosphorus ratios were 18/1 or greater at all sampling stations and times.

IV. NUTRIENT LOADINGS
(See Appendix E for data)

For the determination of nutrient loadings, the Ohio National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page v), except for the high runoff months of February and March when two samples were collected. Sampling was begun in May, 1973, and was completed in April, 1974.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Ohio District Office of the U.S. Geological Survey for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a U.S. Geological Survey computer program for calculating stream loadings*. Nutrient loads shown are those measured minus point-source loads, if any.

Nutrient loads for unsampled "minor tributaries and immediate drainage" ("ZZ" of U.S.G.S.) were estimated using the means of the nutrient loads, in kg/km^2/year, at stations C-1 and E-1 and multiplying the means by the ZZ area in km^2.

The operators of the Belleville and Lexington wastewater treatment plants provided monthly effluent samples and corresponding flow data. The community of Butler did not participate in the Survey, and nutrient loads were estimated at 1.134 kg P and 3.401 kg N/capita/year.

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* See Working Paper No. 175.

A. Waste Sources:

1. Known muncipal -

Name	Pop. Served	Treatment	Mean Flow (m^3/d)	Receiving Water
Lexington*	3,600	stab. ponds	1,366.5	Clear Fk., Mohican River
Belleville*	1,700	prim. clarifier	587.4	Clear Fk., Mohican River
Butler**	1,052	Imhoff tank	398.2	Smoky Run

2. Known industrial† - There are four known industries which discharge to tributaries of Pleasant Hill Reservoir. These include Derwacter Sand and Gravel Co., Bowman and Sons, Inc., General Industries, and Columbia Gas Transmission. These sources probably are relatively insignificant contributors of nutrients and are not included on the following pages.

* Treatment plant questionnaires.
** Anonymous, 1971 (pop. shown is 1970 Census; flow shown is estimated at 0.3785 m^3/capita/day).
† Youger, 1975.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/ yr	% of total
a. Tributaries (non-point load) -		
Clear Fk., Mohican River	1,720	14.2
Switzer Creek	445	3.7
Possum Run	300	2.5
Smoky Run	210	1.7
Slater Run	260	2.2
b. Minor tributaries & immediate drainage (non-point load) -	490	4.1
c. Known municipal STP's -		
Lexington	4,730	39.2
Belleville	2,655	22.0
Butler	1,195	9.9
d. Septic tanks - Unknown	?	-
e. Industrial - Unknown	?	-
f. Direct precipitation* -	60	0.5
Total	12,065	100.0

2. Outputs -

Lake outlet - Clear Fk., Mohican River	9,495

3. Net annual P accumulation - 2,570 kg.

* See Working Paper No. 175.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/ yr	% of total
a. Tributaries (non-point load) -		
Clear Fk., Mohican River	188,005	61.5
Switzer Creek	20,485	6.7
Possum Run	17,415	5.7
Smoky Run	10,725	3.5
Slater Run	15,585	5.1
b. Minor tributaries & immediate drainage (non-point load) -	28,810	9.5
c. Known municipal STP's -		
Lexington	8,835	2.9
Belleville	8,280	2.7
Butler	3,580	1.2
d. Septic tanks - Unknown	?	-
e. Industrial - Unknown	?	-
f. Direct precipitation* -	3,715	1.2
Total	305,435	100.0

2. Outputs -

Lake outlet - Clear Fk., Mohican River	267,180

3. Net annual N accumulation - 38,255 kg.

* See Working Paper No. 175.

D. Mean Annual Non-point Nutrient Export by Subdrainage Area:

Tributary	kg P/km²/yr	kg N/km²/yr
Clear Fk., Mohican River	5	533
Switzer Creek	16	719
Possum Run	8	457
Smoky Run	12	638
Slater Run	12	712

E. Yearly Loads:

In the following table, the existing phosphorus loadings are compared to those proposed by Vollenweider (Vollenweider and Dillon, 1974). Essentially, his "dangerous" loading is one at which the receiving water would become eutrophic or remain eutrophic; his "permissible" loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between "dangerous" and "permissible".

Note that Vollenweider's model may not be applicable to water bodies with short hydraulic retention times.

	Total Phosphorus		Total Nitrogen	
	Total	Accumulated	Total	Accumulated
grams/m²/yr	3.51	0.75	88.8	11.1

Vollenweider phosphorus loadings (g/m²/yr) based on mean depth and mean hydraulic retention time of Pleasant Hill Reservoir:

"Dangerous" (eutrophic loading)	1.36
"Permissible" (oligotrophic loading)	0.68

V. LITERATURE REVIEWED

Anonymous, 1971. Inventory of municipal waste facilities. EPA Publ. OWP-1, vol. 5, Washington, DC.

Durbin, George L., 1973. Treatment plant questionnaire (Belleville STP). Belleville.

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VI. APPENDICES

APPENDIX A

LAKE RANKINGS

LAKE DATA TO BE USED IN RANKINGS

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
3901	BEACH CITY RESERVOIR	0.122	1.490	489.000	10.867	11.600	0.015
3902	BUCKEYE LAKE	0.179	0.380	490.000	186.567	9.600	0.020
3905	CHARLES MILL RESERVOIR	0.127	0.465	482.555	67.144	15.000	0.011
3906	DEER CREEK RESERVOIR	0.098	2.980	470.125	9.887	13.900	0.036
3907	DELAWARE RESERVOIR	0.086	2.340	484.111	10.856	14.500	0.024
3908	DILLION RESERVOIR	0.163	1.590	481.250	27.400	14.300	0.037
3912	GRANT LAKE	0.113	0.570	486.333	40.533	12.200	0.019
3914	HOOVER RESERVOIR	0.040	1.640	462.750	13.017	14.800	0.008
3915	INDIAN LAKE	0.120	0.380	485.222	76.855	14.200	0.012
3917	LORAMIE LAKE	0.185	1.380	494.000	104.100	8.200	0.019
3921	MOSQUITO CREEK RESERVOIR	0.058	0.150	465.333	36.267	11.600	0.006
3924	PLEASANT HILL LAKE	0.036	0.455	456.833	22.850	14.700	0.010
3927	LAKE SAINT MARYS	0.148	0.200	484.167	79.150	8.200	0.014
3928	ATWOOD RESERVOIR	0.031	0.205	462.000	16.442	14.700	0.005
3929	BERLIN RESERVOIR	0.042	0.900	465.435	15.496	13.600	0.006
3930	HOLIDAY LAKE	0.125	0.575	465.333	55.350	15.000	0.034
3931	O'SHAUGNESSY RESERVOIR	0.208	3.070	479.333	5.522	14.900	0.159
3932	ROCKY FORK LAKE	0.067	0.790	473.000	38.022	15.000	0.010
3933	SHAWNEE LAKE	0.069	2.380	474.333	39.567	15.000	0.009
3934	TAPPAN LAKE	0.043	0.280	466.111	37.711	15.000	0.007

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P	INDEX NO
3901	BEACH CITY RESERVOIR	37 (7)	21 (4)	11 (2)	84 (16)	82 (15)	42 (8)	277
3902	BUCKEYE LAKE	11 (2)	76 (14)	5 (1)	0 (0)	89 (17)	26 (5)	207
3905	CHARLES MILL RESERVOIR	26 (5)	63 (12)	37 (7)	21 (4)	11 (0)	58 (11)	216
3906	DEER CREEK RESERVOIR	53 (10)	5 (1)	63 (12)	95 (18)	63 (12)	11 (2)	290
3907	DELAWARE RESERVOIR	58 (11)	16 (3)	32 (6)	89 (17)	47 (9)	21 (4)	263
3908	DILLION RESERVOIR	16 (3)	32 (6)	42 (8)	58 (11)	53 (10)	5 (1)	206
3912	GRANT LAKE	47 (9)	58 (11)	16 (3)	32 (6)	74 (14)	34 (6)	261
3914	HOOVER RESERVOIR	87 (16)	26 (5)	89 (17)	79 (15)	32 (6)	79 (15)	392
3915	INDIAN LAKE	42 (8)	76 (14)	21 (4)	16 (3)	58 (11)	53 (10)	266
3917	LORAMIE LAKE	5 (1)	37 (7)	0 (0)	5 (1)	97 (18)	34 (6)	178
3921	MOSQUITO CREEK RESERVOIR	74 (14)	100 (19)	82 (15)	53 (10)	82 (15)	92 (17)	483
3924	PLEASANT HILL LAKE	95 (18)	68 (13)	100 (19)	63 (12)	39 (7)	66 (12)	431
3927	LAKE SAINT MARYS	21 (4)	95 (18)	26 (5)	11 (2)	97 (18)	47 (9)	297
3928	ATWOOD RESERVOIR	100 (19)	89 (17)	[illegible] (18)	68 (13)	39 (7)	100 (19)	491
3929	BERLIN RESERVOIR	79 (15)	42 (8)	74 (14)	74 (14)	68 (13)	92 (17)	429
3930	HOLIDAY LAKE	32 (6)	53 (10)	82 (15)	26 (5)	11 (0)	16 (3)	220
3931	O'SHAUGNESSY RESERVOIR	0 (0)	0 (0)	47 (9)	100 (19)	26 (5)	0 (0)	173
3932	ROCKY FORK LAKE	68 (13)	47 (9)	58 (11)	42 (8)	11 (0)	66 (12)	292
3933	SHAWNEE LAKE	63 (12)	11 (2)	53 (10)	37 (7)	11 (0)	74 (14)	249
3934	TAPPAN LAKE	87 (16)	84 (16)	68 (13)	47 (9)	11 (0)	84 (16)	381

LAKES RANKED BY INDEX NOS.

RANK	LAKE CODE	LAKE NAME	INDEX NO
1	3928	ATWOOD RESERVOIR	491
2	3921	MOSQUITO CREEK RESERVOIR	483
3	3924	PLEASANT HILL LAKE	431
4	3929	BERLIN RESERVOIR	429
5	3914	HOOVER RESERVOIR	392
6	3934	TAPPAN LAKE	381
7	3927	LAKE SAINT MARYS	297
8	3932	ROCKY FORK LAKE	292
9	3906	DEER CREEK RESERVOIR	290
10	3901	BEACH CITY RESERVOIR	277
11	3915	INDIAN LAKE	266
12	3907	DELAWARE RESERVOIR	263
13	3912	GRANT LAKE	261
14	3933	SHAWNEE LAKE	249
15	3930	HOLIDAY LAKE	220
16	3905	CHARLES MILL RESERVOIR	216
17	3902	BUCKEYE LAKE	207
18	3908	DILLION RESERVOIR	206
19	3917	LORAMIE LAKE	178
20	3931	O'SHAUGNESSY RESERVOIR	173

APPENDIX B

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX C

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR OHIO 1/27/75

LAKE CODE 3924 PLEASANT HILL RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 510.2

TRIBUTARY	SUB-DRAINAGE AREA(SQ KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
3924A1	510.2	6.91	8.72	10.76	10.14	8.44	5.10	3.14	1.90	1.53	1.42	2.94	4.33	5.42
3924A2	352.2	5.80	6.57	8.21	6.63	3.94	2.44	1.50	0.99	0.76	0.76	1.70	3.34	3.54
3924B1	28.5	0.45	0.57	0.71	0.57	0.34	0.18	0.12	0.07	0.05	0.05	0.12	0.26	0.29
3924C1	38.1	0.62	0.74	0.96	0.76	0.45	0.25	0.16	0.10	0.07	0.07	0.16	0.34	0.39
3924D1	16.8	0.27	0.34	0.42	0.34	0.20	0.11	0.07	0.04	0.03	0.03	0.07	0.16	0.17
3924E1	21.9	0.37	0.45	0.57	0.45	0.26	0.14	0.09	0.06	0.04	0.04	0.10	0.21	0.23
3924Z1	51.8	0.85	1.04	1.30	1.05	0.59	0.34	0.22	0.14	0.10	0.10	0.23	0.48	0.54

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 510.2
SUM OF SUB-DRAINAGE AREAS = 509.4

TOTAL FLOW IN = 62.13
TOTAL FLOW OUT = 65.33

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3924A1	5	73	7.42	6	6.71				
	6	73	6.34	3	4.39				
	7	73	4.05	7	6.43				
	8	73	2.32	26	1.73				
	9	73	1.13	15	1.08				
	10	73	1.36	7	1.44				
	11	73	2.97	4	1.98				
	12	73	7.05	2	5.42				
	1	74	15.01	6	16.00				
	2	74	10.14	3	23.33	17	7.67		
	3	74	7.48	3	1.54	17	11.67		
	4	74	12.23	7	21.58				
3924A2	5	73	4.98	6	3.71				
	6	73	4.64	3	3.26				
	7	73	3.00	7	3.65				
	8	73	1.61	26	1.16				
	9	73	0.96	15	0.96				
	10	73	1.13	7	1.05				
	11	73	2.38	4	1.27				
	12	73	4.56	2	2.55				
	1	74	11.67	6	2.66				
	2	74	5.32	3	5.04	17	4.33		
	3	74	7.90	3	5.75	17	9.46		
	4	74	7.31	7	9.32				

TRIBUTARY FLOW INFORMATION FOR OHIO 1/27/75

LAKE CODE 3924 PLEASANT HILL RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
3924B1	5	73	0.45	6	0.31				
	6	73	0.34	3	0.08				
	7	73	0.17	7	0.13				
	8	73	0.11	26	0.08				
	9	73	0.03	15	0.09				
	10	73	0.05	7	0.05				
	11	73	0.15	4	0.08				
	12	73	0.37	2	0.22				
	1	74	1.73	6	0.48				
	2	74	0.48	3	0.28	17	0.34		
	3	74	0.45	3	0.48	17	0.74		
	4	74	0.65	7	0.76				
3924C1	5	73	0.62	6	0.42				
	6	73	0.45	3	0.10				
	7	73	0.23	7	0.18				
	8	73	0.14	26	0.11				
	9	73	0.05	15	0.06				
	10	73	0.06	7	0.06				
	11	73	0.20	4	0.11				
	12	73	0.48	2	0.28				
	1	74	2.38	6	0.54				
	2	74	0.62	3	0.40	17	0.45		
	3	74	0.62	3	0.62	17	0.96		
	4	74	0.88	7	1.02				
3924D1	5	73	0.27	6	0.18				
	6	73	0.20	3	0.05				
	7	73	0.10	7	0.08				
	8	73	0.06	26	0.05				
	9	73	0.02	15	0.01				
	10	73	0.02	7	0.03				
	11	73	0.09	4	0.05				
	12	73	0.22	2	0.13				
	1	74	1.05	6	0.24				
	2	74	0.28	3	0.17	17	0.20		
	3	74	0.28	3	0.28	17	0.42		
	4	74	0.40	7	0.45				
3924E1	5	73	0.34	6	0.24				
	6	73	0.26	3	0.06				
	7	73	0.13	7	0.10				
	8	73	0.08	26	0.06				
	9	73	0.03	15	0.01				
	10	73	0.03	7	0.03				
	11	73	0.12	4	0.07				
	12	73	0.28	2	0.17				
	1	74	1.39	6	0.31				
	2	74	0.40	3	0.23	17	0.26		
	3	74	0.37	3	0.37	17	0.57		
	4	74	0.51	7	0.57				

TRIBUTARY FLOW INFORMATION FOR OHIO 1/27/75

LAKE CODE 3924 PLEASANT HILL RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
392422	5	73	0.79						
	6	73	0.62						
	7	73	0.31						
	8	73	0.21						
	9	73	0.07						
	10	73	0.08						
	11	73	0.28						
	12	73	0.66						
	1	74	3.23						
	2	74	0.91						
	3	74	0.0						
	4	74	1.19						

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APPENDIX D

PHYSICAL and CHEMICAL DATA

STORET RETRIEVAL DATE 75/01/27

392401
40 38 27.0 082 21 27.0
PLEASANT HILL LAKE
39139 OHIO

11EPALES
3

2111202
0012 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/20	12 25	0000	13.4		36	300	8.70	110	0.030	0.300	0.830	0.013
	12 25	0004	13.0	12.8		290	8.50	108	0.020	0.300	0.820	0.006
	12 25	0008	12.5	12.8		300	8.70	107	0.030	0.400	0.820	0.006
73/07/30	14 45	0000	25.2	8.2	40	343	8.60	129	0.050	1.000	0.190	0.010
	14 45	0008	24.1	8.3		343	8.20	130	0.040	0.600	0.170	0.016
73/10/06	12 20	0000	19.4		33	327	8.10	148	0.110	0.700	0.180	0.011
	12 20	0004	19.1	7.4		330	8.00	150	0.130	0.500	0.220	0.014

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/20	12 25	0000	0.030	32.3
	12 25	0004	0.030	
	12 25	0008	0.027	
73/07/30	14 45	0000	0.053	24.6
	14 45	0008	0.070	
73/10/06	12 20	0000	0.038	15.8
	12 20	0004	0.061	

STORET RETRIEVAL DATE 75/01/27

392402
40 38 26.0 082 21 25.0
PLEASANT HILL LAKE
39139 OHIO

11EPALES
3

2111202
0040 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
73/04/20	12 40	0000	11.5		54	300	8.80	102	0.020	0.400	0.780	0.005
	12 40	0006	10.9	13.9		280	8.80	101	0.020	0.200	0.800	0.005
	12 40	0015	10.0	11.5		310	8.30	101	0.020	0.300	0.820	0.004
	12 40	0025	9.4	11.0		290	8.40	101	0.040	0.300	0.840	0.005
	12 40	0036	9.1	10.9		285	8.40	101	0.070	0.300	0.840	0.005
73/07/30	15 05	0000	24.4	5.0	42	346	7.90	133	0.150	0.800	0.200	0.010
	15 05	0005	23.7	3.5		345	7.70	136	0.210	0.700	0.220	0.013
	15 05	0010	23.5			344						
	15 05	0017	22.6	0.3		342	7.50	140	0.340	1.000	0.070	0.010
73/10/06	12 40	0000	20.5		54	330	8.00	147	0.150	0.600	0.100	0.010
	12 40	0005	20.2	6.4		329	7.90	145	0.190	0.600	0.110	0.009
	12 40	0021	19.7	3.6		330	7.60	146	0.420	1.100	0.060	0.010

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L
73/04/20	12 40	0000	0.021	41.7
	12 40	0006	0.018	
	12 40	0015	0.021	
	12 40	0025	0.022	
	12 40	0036	0.028	
73/07/30	15 05	0000	0.045	10.0
	15 05	0005	0.048	
	15 05	0017	0.047	
73/10/06	12 40	0000	0.035	12.7
	12 40	0005	0.037	
	12 40	0021	0.061	

APPENDIX E

TRIBUTARY and WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/02/03

39284A1
40 37 25.0 082 19 31.0
CLEAR FORK MOHICAN RIVER
39155 7.5 JELLOWAY
O/PLEASANT HILL RES
AT PLEASANT HILL DAM SPILLWAY
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/06	09	15	0.510	1.380	0.050	0.011	0.060
73/06/03	09	45	0.370	2.300	0.072	0.008	0.032
73/07/07	09	58	0.460	0.840	0.105	0.015	0.045
73/08/26	09	51	0.050	1.260	0.147	0.020	0.060
73/09/15	10	11	0.032	0.690	0.198	0.021	0.065
73/10/07	10	00	0.075	1.450	0.310	0.016	0.085
73/11/04	14	30	0.192	0.550	0.116	0.016	0.035
73/12/02	10	12	0.470	0.400	0.046	0.016	0.040
74/01/06	10	45	1.430	0.300	0.060	0.052	0.075
74/02/03	12	30	1.430	0.300	0.055	0.040	0.050
74/02/17	11	05	1.260	0.300	0.015	0.020	0.045
74/03/03	10	45	1.340	0.400	0.025	0.025	0.070
74/03/17	15	10	1.300	0.600	0.045	0.025	0.060
74/04/07	15	20	1.090	0.300	0.035	0.025	0.055

STORET RETRIEVAL DATE 75/02/03

3424A2
40 35 50.0 082 26 35.0
CLEAR FORK MOHICAN RIVER
39 7.5 BUTLER
1/PLEASANT HILL RES
ST RT 97 BRDG .75 MI W OF BUTLER
11EPALES 2111204
0000 FEET DEPTH
4

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/06	10 05		0.680	0.640	0.013	0.016	0.035
73/06/03	10 45		0.063	0.890	0.105	0.034	0.055
73/07/07	11 00		0.570	2.200	0.110	0.028	0.080
73/08/26	10 30		0.530	0.220	0.023	0.048	0.075
73/09/15	11 08		0.750	0.520	0.100	0.088	0.120
73/10/07	11 00		0.590	1.350	0.105	0.096	0.165
73/11/04	14 35		0.640	0.450	0.008	0.005K	0.040
73/12/02	10 55		1.500	0.300	0.048	0.058	0.070
74/01/06	09 30		1.430	1.400	0.056	0.020	0.065
74/02/03	11 10		1.520	0.400	0.065	0.030	0.055
74/02/17	10 15		1.340	1.400	0.085	0.040	0.170
74/03/03	09 45		1.340	0.400	0.040	0.030	0.040
74/03/17	14 40		1.200	0.900	0.025	0.010	0.050
74/04/07	14 35		1.100	0.500	0.035	0.010	0.020

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

392401
40 39 00.0 082 23 40.0
SWITZER CREEK
39 7.5 LUCAS
T/PLEASANT HILL RES
BROADFIELD RD BRDG 4 MI SSE OF LUCAS
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/06	10 35		1.300	0.980	0.019	0.009	0.030
73/06/03	11 00		1.260	1.760	0.120	0.058	0.195
73/07/07	11 20		1.240	0.600	0.096	0.015	0.025
73/08/26	10 55		0.910	0.660	0.060	0.010	0.020
73/09/15	11 26		0.890	0.960	0.052	0.020	0.040
73/10/07	11 30		0.730	1.050	0.105	0.024	0.090
73/11/04	14 06		0.770	0.950	0.040	0.068	0.070
73/12/02	11 25		1.350	0.400	0.036	0.028	0.040
74/01/06	11 10		1.930	1.600	0.180	0.008	0.015
74/02/03	12 50		2.100	0.200	0.020	0.010	0.010
74/02/17	11 25		1.800	0.300	0.015	0.025	0.055
74/03/03	11 15		1.700	0.200	0.015	0.010	0.055
74/03/17	15 25		1.700	0.300	0.020	0.010	0.026
74/04/07	15 45		1.800	0.200	0.020	0.010	0.022

STORET RETRIEVAL DATE 75/02/03

3424C1
40 37 40.0 082 24 40.0
POSSUM RUN
39 7.5 LUCAS
T/PLEASANT HILL RES
POSSUM RUN RD BRDG 1.5 MI # OF NEWVILLE
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/06	10	22	0.470	0.550	0.026	0.007	0.025
73/06/03	10	53	0.380	1.155	0.132	0.012	0.030
73/07/07	11	10	0.530	1.050	0.042	0.011	0.020
73/08/26	10	40	0.120	0.390	0.028	0.008	0.020
73/09/15	11	16	0.200	0.300	0.031	0.010	0.020
73/10/07	11	15	0.140	0.200	0.030	0.015	0.045
73/11/04	14	10	0.140	0.150	0.008	0.010	0.025
73/12/02	11	10	0.920	0.800	0.036	0.020	0.025
74/01/06	10	00	2.500	0.200	0.064	0.008	0.020
74/02/03	11	30	2.300	0.200	0.015	0.010	0.010
74/02/17	10	35	1.920	0.100	0.010	0.005	0.020
74/03/03	11	00	1.040	0.100	0.005	0.005K	0.040
74/03/17	15	15	1.040	0.600	0.025	0.005	0.020
74/04/07	15	30	1.060	0.200	0.015	0.010	

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

392401
40 35 1?.0 082 25 35.0
SMOKY RUN
39 7.5 BUTLER
T/PLEASANT HILL RES
ST RT 97 BRDG IN BUTLER
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/06	09	50	0.970	1.050	0.031	0.005K	0.015
73/06/03	10	35	0.750	1.260	0.063	0.022	0.092
73/07/07	10	25	0.920	1.540	0.064	0.011	0.025
73/08/26	10	05	0.620	0.880	0.096	0.013	0.030
73/09/15	10	40	0.550	0.840	0.054	0.007	0.030
73/10/07	10	25	0.630	1.200	0.336	0.052	0.125
73/11/04	14	50	0.830	0.300	0.064	0.012	0.045
73/12/03	10	38	1.760	0.300	0.024	0.016	0.030
74/01/06	10	10	1.700	0.200	0.024	0.008	0.015
74/02/03	11	40	1.680	0.100	0.010	0.005	0.005
74/02/17	10	40	1.400	0.200	0.010	0.005	0.025
74/03/03	10	15	1.600	0.700	0.025	0.005	0.065
74/03/17	15	00	1.510	0.500	0.025	0.010	0.032
74/04/07	14	55	1.600	0.300	0.015	0.005	0.005

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

3424E1
40 35 13.0 082 25 10.0
SLATER RUN
37 7.5 BUTLER
T/PLEASANT HILL RES
ST RT 97 BRDG E EDGE OF BUTLER
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 4-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
73/05/06	09 44		1.600	0.390	0.021	0.005K	0.010
73/06/03	10 30		0.046	0.750	0.230	0.018	0.060
73/07/07	10 22		1.680	1.510	0.140	0.011	0.025
73/08/26	10 00		1.000	0.250	0.039	0.034	0.034
73/09/15	10 37		0.856	0.320	0.039	0.012	0.035
73/10/07	10 20		1.000	1.000	0.170	0.023	0.085
73/11/04	14 45		1.440	0.750	0.052	0.016	0.040
73/12/02	10 34		2.640	0.300	0.060	0.016	0.035
74/01/06	11 00		1.260	0.200	0.036	0.008	0.020
74/02/03	12 40		1.200	0.100	0.015	0.010	0.010
74/02/17	11 15		1.060	0.200	0.010	0.016	0.030
74/03/03	10 10		2.200	0.300	0.020	0.010	0.070
74/03/17	14 55		2.200	1.000	0.030	0.005	0.040
74/04/01	14 50		2.080	0.300	0.025	0.010	0.012

K VALUE KNOWN TO BE
LESS THAN INDICATED

STORET RETRIEVAL DATE 75/02/03

3424AA IP3424AA P003600
40 40 45.0 082 34 45.0
VILLAGE OF LEXINGTON
39 RICHLAND COUNTY
T/PLEASANT HILL RESERVOI
CLEAR FORK MOHICAN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/04/05	15	30	0.015	22.000	4.000	9.960		0.314	0.347
73/10/15	09	30	0.031	9.100		9.412	13.500	0.325	0.319
73/12/11	10	30	0.940	22.000	5.200	10.200	13.000	0.364	0.300
74/01/14	11	00	0.860	36.000	8.000	7.800	9.300	0.450	0.575
74/03/21	14	30	1.440	13.000	3.000	5.100	7.100	0.476	0.410
74/04/25	11	00	0.450	15.000	1.700	6.800	8.000	0.309	0.369
74/05/31	10	30	2.100	18.000	1.800	8.600	10.000	0.320	0.315
74/06/25	13	30	2.730	12.500	0.035	8.500	9.600	0.357	0.453
74/07/24	10	15	0.240	18.000	0.066	5.100	6.600	0.345	0.327
74/08/21	10	15	0.050	12.000			8.600	0.296	0.357
74/09/17	11	00	2.200	8.350	0.075	8.600	9.550	0.290	0.305
74/10/15	14	00	3.080	5.200	0.059	9.600	10.000	0.345	0.315
74/12/23	14	00						0.345	0.301

STORET RETRIEVAL DATE 75/02/03

3924AB PR3924AB P001700
40 37 15.0 082 30 15.0
BELLEVILLE
39 RICHLAND COUNTY
T/PLEASANT HILL RESERVOI
CLEAR FORK MOHICAN RIVER
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
73/08/20	07	00							
CP(T)-			0.105	35.700	20.400		7.600	0.142	0.149
73/08/20	15	00							
73/09/04	07	00							
CP(T)-			0.010K	50.000	16.400	11.200		0.136	0.139
73/09/04	15	00							
73/09/30	07	00							
CP(T)-			0.200	42.900	21.000	10.000	20.000	0.118	0.132
73/09/30	15	00							
73/10/31	07	00							
CP(T)-			0.400	45.000	25.000	8.000	15.700	0.156	0.130
73/10/31	17	00							
73/11/30	07	00							
CP(T)-			0.160	48.000	23.000	7.100	21.000	0.161	0.139
73/11/30	15	00							
73/12/31	07	00							
CP(T)-			0.200	46.000	32.000	9.200	15.700	0.154	0.145
73/12/31	15	00							
74/01/31	07	00							
CP(T)-			1.200	22.000	8.600	4.200	8.050	0.197	0.249
74/01/31	15	00							
74/02/28	07	00							
CP(T)-			0.320	25.000	9.900	5.900	9.000	0.164	0.144
74/02/28	15	00							
74/03/31	07	00							
CP(T)-			0.840	21.000	6.950	3.700	6.400	0.176	0.169
74/03/31	15	00							
74/04/30	07	00							
CP(T)-			0.120	41.000	18.800	7.350	10.500	0.173	0.177
74/04/30	15	00							
74/05/31	07	00							
CP(T)-			0.040	50.000	31.000	11.650	14.000	0.145	0.148
74/05/31	15	00							
74/06/30	07	00							
CP(T)-			0.560	43.000	24.000	8.100	10.000	0.129	0.141
74/06/30	15	00							